

# **A Curriculum Based on the Psychology of Skill: Collaborating with Instructors with Disdain for Teaching Beginning Design**

**Stephen Temple, Associate Professor  
APRIL 30 DRAFT**

**University of Texas San Antonio**

## **Introduction**

Many design curricula are structured to utilize instructors in beginning design who do not normally teach beginning design. These instructors frequently misconstrue core foundational pedagogical initiatives for student development of creative design processes by importing ill-suited pedagogical approaches either from advanced studio methods or from design practices with little educational objectives. Others misconstrue beginning design pedagogy as mere acquisition of basic proficiencies in the belief that these skills can only be creatively applied in advanced studios or that students should explicitly be taught what they will need to know for future classes that these very instructors teach. Still others believe they are lowering themselves in teaching beginning design studio curricula, or, in the extreme, that teaching beginning design is in some way a punitive assignment. Instead, it should be realized that teaching at the foundation level of design curriculum offers opportunities for fundamental explorations of creative practices, with students whose relatively unencumbered approaches allow for discovery and invigoration of fresh design inquiries.

The difficulties outlined above expose a schism between the educational mission of what is called the “bottom” of the curriculum, with its beginning foundational learning experiences, and the so-called “top” of the curriculum, with more content centered courses. Though causes of this schism may be found in instructor biases, curriculum structure, and other systemic factors, reading these difficulties through the psychology of skill attributes the misconstrual of beginning design pedagogies to a failure of curriculum to support development of creative skill as an emergent attribute of design education. Research in the psychology of skill characterizes development of skill as a staged systematic process leading to the emergence of mature skillfulness. Thus, pedagogical and instructional methodologies that underlie curriculum structure must support psychological development of skill as a natural systematic correlate of student progress.

This paper will present the learning of design skills as specifically structured to connect development of creative capacities to psychological aspects of learning skill. As such, schema will be given to pedagogical intentions and the experience of teaching as a means of overcoming instructors who teach out of context or who do not like to teach beginning design or who are more connected to the methodologies of design practice. To expose the effectiveness of the curriculum model in transforming instructional approaches,

the paper will juxtapose developmental structures that support creative education with those that foster “professional education.” The intention is to expose differences in pedagogical underpinnings that lead to ways to integrate the perspective of each into an operable set of conditions that can be successfully and appropriately shared among all means of beginning design instruction.

## The Psychology of Skill

In his book, “The Psychology of Skill,” Philip Tomporowski claims that skills are learned in four primary developmental stages that progress through and are activated through psychological processes and motivations. Stages of learning skill begin with the *experiential* level and progress through *cognitive* and *associative* levels until the fourth *autonomous* stage is achieved. Central to Tomporowski’s approach in that skill is an emergent human endeavor. That is, each successive stage toward skill development comes into fruition as a compounding of the results of the stages preceding it.<sup>1</sup>

The **experiential** level of the psychology of skill is basic in that we each have an experienced body that is always in contact with the world that, by necessity, involves underlying biophysical, physiomotor, and thereby neurological exploration. Most learning at this level occurs implicitly (or unconsciously) through playful exploration & repetition. There is first an unawareness of any learning taking place, however, it may later develop into an awareness of sorts, even without any intention of further developing into focused skills.

In the second, **cognitive** phase, choices, planning, and goals are gradually made with respect to a developing “schema” as a generalized way of organizing knowledge. A schema is a sense of relation to that being acted upon and is a structure built upon and transformed as experiences accumulate. Oversimplifying, the cognitive phase is when an individual begins gradually to form a structure of experiences, transitioning from unstructured into structured activities with specificity to learning objectives. Use of mental representations (or the ability to think about thinking) begins to guide experiential interactions, both for existing conditions and of memory of past interactions. There is a developing awareness of having strategies and the implications of these strategies regarding choices, planning, and goals related to experience. There is an increasing ability to break down tasks and then reorganize them more rapidly. Perceptual learning will begin to form, a developing ability to sort through percepts to both distinguish and construct unified perceptual experiences. Increasingly within the cognitive stage there is the use of *priming* - an effect in psychology where previous experience is unconsciously utilized, increasing speed, accuracy, and predictability of responses.

The third psychological stage of learning skill is the **associative** stage. At this stage the sensory, the spatial, and the symbolic become evident as concepts within experience,

where there is the ability for effective differentiation “between stimuli important for performance and those that are not”<sup>2</sup> in relation to a given set of outcomes. As skill levels increase there is a noticeable shift from slow and laborious efforts to those that are more rapid and smooth. In psychological language, there is a use of chunking, or grouping, in memory tasks that aid interactive memory and the use of increasingly complex methods, like mnemonics (associations like place or objects) to create and define a schema of relations. In the associative level there is an increasing ability to discriminate sets of cues related to experience and action. Reaching the associative level causes increasing demands to be made upon self if one is to improve into the final, autonomous stage. There is a shift in focus from outcome goals to process goals as there is an awareness of the need for refinement and importantly, a shift to intrinsic motivation, where self-involvement becomes desired as a means of progressing skill development. If the individual is not further motivated they will not emerge from this level because the final level depends upon self-initiated, deliberate, and serious motivation toward increasing performance.

At the achievement of an **autonomous** stage of skill development, discrimination is practiced throughout the task(s) being performed as it is drawn from task-specific recognition of evaluation by measures from the now highly developed schema. Because the relation of action to the now highly complex schema is more fluid, as evidenced in a ready use of general principles in judgment or decision-making, rapid decision-making can occur with “less effortful thought.” At an autonomous level of skill performance there is an internalization of motives. Performance of skill is an inherently enjoyable activity, and its performance occurs in and even helps create a heightened state of well being.<sup>3</sup>

Achievement of fully self-motivated performance does not occur, however, as a static moment but is a dynamic and constantly transformative refinement of the relation of performance to the schema. Partly in response to the desire to maintain high level of skill, the possibility of discovery of greater interconnected depths possible in the performance of the skill sustains desire to seek future possible and ever more complex schemata.

One does not acquire skill. One works to achieve it. Moreover, one works through psychological transformations in the achievement of skill sets. In fact, a psychologically transformative process of self-development is necessary to achieving a level where one can be described as having well developed skill.

## **The Development of Creativity**

Creativity in architectural design is evident in the transformation from concept to realization in built form. Buildings can easily be described as constructed ideas, both in terms of their experience and also in terms of how they are brought about through design.<sup>4</sup> **Design** processes are phased in developmental stages that parallel creative processes in

that they are emergent. Similar to the psychology of skill, each successive stage emerges out of a resolution of the difficulties of the stage before it. Development is “propelled” into the next stage as the creative person’s sense of purpose begins to take form.<sup>5</sup> Ideas are discovered within these movements from stage to stage rather the result of momentary or inspired creative focus. Moreover, ideas do not emerge full-form, but are instead interactive dynamic combinations that occur through time, are novel, and complex.<sup>6</sup> Emergence is an important characteristic of design education because it often happens that the development of a student designer is also emergent throughout design education.

In teaching beginning design studios that introduce design through creative design exercises, it almost always occurs that students undergo a fundamental transformation of self throughout the semester long sequence of projects. Though occurring at a different time frame for each student, there seems to be a point in design education that students seem to “get it,” emerging into more complex states of awareness and understanding that activate their design processes and even their self-engagement. In itself not a confirmation of psychological aspects of learning creativity, this observation nevertheless suggests parallels between the processes of the psychology of skill and the stages of creative development. Searching for a way to encourage creativity in science education, Anne Bore has outlined a four phased process model used in instilling creativity in curriculum, that, when correlated with that of the psychology of skill, discloses creativity as a developmental process that moves in emergent layers from the open expansiveness of full human experience to a directed, controlled, yet discovered purposefulness toward it. Bore’s four conceptual phases describe the development of creative skills as processes of: uncertainty, visioning, realization, and readiness.<sup>7</sup>

Correlating with the initial level of experience in the psychology of skill is Bore’s category of **uncertainty**, described as a “grappling with the ambiguity of circumstances necessary for creativity.” Indeed, most students have a great difficulty with the uncertainty caused by the ambiguity and vagueness that comprise situations that call for creative approaches. Some chaos is integral to the process of beginning to develop creativity, manifest in “not knowing what to do.” By necessity in situations calling for creativity, “what to do” is outside of any normative paradigm of action or decision-making. Some initial negative responses are expected as it is realized that the situation is ambiguous and resists ready direction for action. Students typically fight with the ambiguity and grope for direction, some giving in to preconceived directions while others try a more playful, exploratory engagement while suspending disbelief and judgment. Most find that the collaborative interchange of ideas available to studio culture becomes a ready way of both working out possibilities and venting frustration.

Following a period of ambiguity and uncertainty at the outset of a creative venture is a phase described as **visioning**. In this phase it becomes recognized that there becomes a

need for strategies within uncertainty through a generation of ideas of value. It becomes recognized that there is need to decide between what may be of value and what is not valuable by establishing criteria, which in turn leads to a schema of relationships. There is also a general acclimation to the removal of the familiar boundaries caused when uncertainty takes us out of the path of familiar processes that eventually becomes an embracing of uncertainty.

Once a schema begins to form within the creative process an individual will begin a process of **realization** that there is ability to move among various choices that might be made. These choices, in turn, cause continual reformulation and refinement of the schema, sometimes in novel or unforeseen ways. Students work through this phase by discovering and testing conceptual directions and deciding which directions, by degree, may not fit as a schema takes shape.

Once direction begins to be well established there is emergence into the final stage of **readiness**. This is the moment when ideas acquire emerging structure and relatedness. An operable schema is formed and decisions flow easily into a structure of relatedness. Students find that creative decisions seem to fit more effortlessly into what may appear as an external structure with its own ordering system. Motivation becomes internalized as it takes form as an eagerness and gratification with putting ideas into practice by repeatedly working through stages.

## **Structure of Professional Education**

Instructors who confuse the curricular mission of beginning design pedagogy have developed a disjunction between a professional education model and creative activities. With teaching methods that are closer to a practice based structure, creative activities are assumed and/or internalized within the praxis of advanced design studio methods or design practice itself. Many times I have heard the expression, "First year students don't even know what they don't know" as if summing up the beginning condition as wholly lacking in progress toward skill acquisition. Calling beginning design students by the term "novice," as is frequently done, refers to a widely accepted characterization of individuals who have little or no operative knowledge of procedures and behaviors common to the practicing professional. But there is in this description a fundamental misunderstanding of an individual involved in creative learning that discredits emergent creative developmental pedagogy in favor of a professional development approach. I believe this confusion reveals a fundamental misperception of the context of learning that has its source in a widely held model of professional development that does not account for emergent creative development.

In the 1980's, brothers Stuart E. Dreyfus, an applied mathematician, and Hubert L. Dreyfus, a philosopher, developed what is now an accepted model of how individuals progress through multiple levels in their acquisition of skill. Individuals in these progressive stages are characterized as novice, advanced beginner, competent, proficient, and expert.<sup>8</sup> These stages are in large part held out as the basis for the development of professional skills and are the basis for professional development curricula in many fields.<sup>9</sup>

The initial level of Dreyfus model of skill acquisition is the **novice level**, during which the individual seeking a skill set operates principally by consciously learned rules that are free of any context and as such are without any sense of any overall task. Individuals at this level tend to show little discretion in their judgments or situational awareness and thus can have a rigid adherence to taught rules or plans. They often rely on preconceptions, especially regarding the nature of the disciplinary skill set they seek.

In level two of the Dreyfus model learners are called **advanced beginners**. Having advanced from the novice level the advanced beginner will use more sophisticated rules, which refer to situational aspects as well as some of those not in context, although the recognition of situation is still limited. These situational aspects are features such as patterns that allow for distinctions to be made. However, the advanced beginner has trouble formalizing these situational aspects or taking action on them as they are based on guidelines derived from broad characteristics of situations that tend to be realized or discovered only after some prior experience. Commonly, there is disconnection between characteristics and variables and they are given nonhierarchical significance, unrelated to any structure.

The third level of progress in the Dreyfus model is called **competent**. An individual has enough prior experiences to be able to recognize many situational aspects as well as those outside of context, especially through the application of analytic thought. However, an individual at the competent level continues to lack recognition of their overall importance to the task at hand. Thus, they will be quickly overwhelmed and will resort to developing a structure for dealing with it by setting goals within hierarchical planning. However, this hierarchical restructuring is limited to paying attention only to a small number of features with respect to sets of specific sub-goals, the intention being merely to reduce confusion. At the competent level the individual can begin to perceive some actions in terms of more long-term objectives and begins to use conscious, more purposeful planning, having accumulated enough experience that procedures begin to become standardized.

An individual at level four of the Dreyfus model is called **proficient** and is characterized by decision making that is less labored and will frequently perform using "intuition," usually without analytic thinking. As such, this deep engagement will be interrupted when certain aspects become suddenly present as particularly important. The proficient then stops and thinks analytically about what to do next. The proficient perceives

situations in terms of the whole rather than in terms of particular aspects and is capable of perceiving what is most important in a task or circumstance. At this level the individual can distinguish deviations from normal patterns and will readily use learned principles for guidance of decision making.

The **expert** level is the fifth and final level of the Dreyfus model. Since an individual has progressed through all previous levels there is now a grasp of situations based on deep understanding. An expert typically performs tasks intuitively, only occasionally stopping to deliberate using critical reflection on intuitions, instead of relying on rules, guidelines, or planning based on goals or objectives. Analytic thinking is used only when a problem or novel situation will occur. Importantly, an expert develops a vision of the possibilities of a situation.

The Dreyfus model as applied to professional development is an additive or cumulative process. It is a progression from rule finding and problem-solving into a state based on matching or comparing against past experiences to form schemata of actions. While the Dreyfus model is developmental, it is a progressive structure, meaning that each level is the additive composite of the levels before it and is not emergent. Making progress assumes an individual engaged in professional skill acquisition moves incrementally toward an improved state with respect to the operative knowledge of a particular profession, only “getting it” at the final level.

## **Comparative Teaching Models for Beginning Design**

When viewed from the perspective of teaching, beginning design is comparable to the initial position of skill development. Beginning design is where experiential learning is most crucial and the basis of this experience is in questioning, in deep inquiry that is often unsettling in its ambiguity and uncertainty. Structures that help students reflect on these experiences help cast them into constructing their own paths into their own learning as a prefigurement of the development of schemata that later become the basis for their internalized autonomy as creative decision makers (described less correctly, I believe, as “intuition” in the Dreyfus model). While not directly analogous to the first year of design education, the initial stages of the psychology of skill, of the creative process, and of the professional development/Dreyfus model, offer a revealing comparison of instructional methodology, especially in relation to what is taking place in the learner. Instructor biases are related to the perspectives of the instructor, the design curriculum, and within systemic factors.

**Instructor based difficulties in beginning design educational methods stem from a variety of contradictions of the instructor from the context of beginning design.** The instructor that is placed in beginning design courses or from advanced

studios or from design practice is away from their place of specialization. First, they may have very particular ways of operating due to a teaching focus or a way of practicing that does not allow for them to negotiate a student body that, in their minds know nothing, or is otherwise confounded by the uncertainty of making creative design decisions. Secondly, these instructors are away from their comfort, no longer teaching from a specialized content area or operational mode so they do not address long periods of student uncertainty. Ambiguity is embraced as a starting point in beginning design projects and is the “content” of the creative learning experience whereas in upper level design studios and practice, content is more clearly established and even concrete. Thirdly, these instructors often teach from a mastery model of teaching when in fact a different model of teaching is needed. Students are different in beginning design courses. They are more demanding, even needy, as they encounter what for them is a confounding ambiguity of the creative situation. An instructor teaching under a mastery model has no place for needy students. I have found that the model of teaching that is most successful involves acting somewhat like a parent where one can understand the need for “tough love” and letting a student grapple with ambiguity of creative issues on their own terms and despite their quite necessary failures.

**Some difficulties experienced by some beginning design instructors are based in the curriculum structure.** First, many beginning design course sequences, whether labeled “introductory,” or “foundational,” or “pre-architecture,” or just simply “design,” are artificially differentiated from advanced design courses. Some of these differences stem from the specificity of the nature of design inquires while others have to do with the degree of application instead of the way of thinking of the discipline of architectural design. Jerome Bruner stated that:

“ There is nothing more central to a discipline than its way of thinking. There is nothing more important in its teaching than to provide ... the earliest opportunity to learn that way of thinking - - the forms of connection, the attitudes, the hopes, jokes, and frustrations that go with it. At the very first breath, the young learner should, we think, be given the chance to solve problems, to conjecture, to quarrel, as these are done at the heart of the discipline” 10

Following Bruner, both instructors teaching beginning design and the curriculum structure itself need to put aside distinctions between curricular course positions and instead recognize the position of the learner in the quest for creative skills.

Secondly, advanced design course work is typically focused and issue-based, therefore, the degree and means of exploration is more controlled. Beginning design



coursework that fosters creative inquiry enjoins the full experience of the student in constructs where uncertainty not only occurs but is the expected condition. Lack of control is the norm. It is not merely that the student has a novice level of understanding that disquiets some instructors but that the instructor must cultivate this lack of knowing. This is very often outside the day to day operation of a design practitioner or an advanced design instructor and they must, if they are to be successful beginning design instructors, come to realize that these are the precise and necessary beginnings of creative activities.

A third issue involves the propensity of beginning design instruction to frequently lead to day to day guidance of student classroom activities and even some student thinking as projects unfold. Beginning student interest sometimes wanes in the face of creative problems that are either perceived with superficial inquiry or as insurmountable and impossible. In advanced design more is left to student self-guidance and many prior skills are assumed to have been previously addressed so the instructor returning to beginning design often feels overwhelmed with having to provoke student inquiry but at the same time concerned about giving away too much in an inclination to show and tell. Some wrongly come to the role as directors of creativity and thus thwart student development by not letting them grapple with the creative issues. In beginning design an instructor sets up conditions for work as a scaffold or peripheral support for the learning that takes place in student decision-making. In upper level design studios and design practice the work and the process of work is implicitly more abstract and then complexly so. There is always a tendency to assume that beginning design students understand abstraction and its nuances. Instructors teaching from outside beginning design can make the mistake of letting this assumption get too far into a project or deriding the beginning student for not having better understanding. In fact, faculty need to remain vigilant of student decision making because they will easily stray or make decisions in unintended realms. Because they are more broadly provoking creativity, projects need to be thoughtfully structured to foster inquiry but be subtly unknowingly guided.

Finally, beginning design students have a tendency to a more extreme relationship with the instructor through the course assignments than do advanced students. Beginning designers are making a great self-transformation in their first year (or they are denying it vigorously) and thus either become very interested or show their frustrations vigorously and become a distraction or they disappear. In either case, maintaining morale is tasked to the instructor and some do not like this, perceiving it as unnatural in contrast to the more dutiful and committed students of the advanced classroom.

**There are many systemic factors that also contribute to instructor difficulties in teaching beginning design.** The following descriptions of systemic problems are offered without prescription for actionable means of resolving difficulties in beginning design instructions because problematic systems usually require a systemic fix. Instructors

finding themselves in one of these curricular situations know that modifying their pedagogical methods or those of another instructor without a major curricular assessment is unlikely.

First, if a curriculum is structured as a professional education model it will be inconsistent with teaching to foster creativity structured or intentionally devaluing creativity in the curriculum. Sometimes these curricula are purposefully structured and sometimes they are this way by default. Most often however curricula are subject to internal drift, where one part of the curriculum has taken on characteristics of a professional development model while the other part fosters creativity. Being out of sync, instructors cannot navigate well in both pedagogical worlds without clear recognition of the educational intentions of that part of the curriculum in which they find themselves. Nevertheless, a split curriculum or a curriculum in drift is need of attention because student skill development is not being well benefited, and this is the primary mission of curriculum.

Secondly, this raises the issue of whether the educational mission of curriculum is in fact directed toward student development of skills versus mere conveyance of professional content. Is the curriculum supporting exploration and development of creative capacities or has addressing the distribution of content in an additive manner merely driven its structure? The latter follows only a professional education model in its bare skeletal form and ignores the development of student skills beyond that of becoming an expert in name only. Students must gain access to the creative structuring of knowledge or its activation by a diploma will be well short of the experience it is meant to signify. Faculty who migrate into beginning design courses from within this kind of curricular structure face circumstances where they are called on to indoctrinate students rather than serve their self development.

Thirdly, sometimes foundational experiences and skills are assumed in upper level design courses by faculty teaching in them. When these instructors teach beginning design courses they fall into the mode of “teaching them what they will need to know when they get into upper level courses.” This mode, the teaching of spot skills, disregards self-development of the student and the developmental nature of curriculum structure. Though teaching from the top down may offer lip service to a professional education model, it fails to recognize even the idea of progress and lapses into mere training, and thus, shuns the idea of education.

A fourth difficulty with instructors teaching beginning design who normally teach upper level design courses or who are design practitioners is that creative discovery, as an end in itself, is not as interesting as its application in more practical ends. For them the “proof of the pudding” is in application rather than the development of creative capacities, especially at the early stages. It is also likely that these instructors, driven by accreditation criteria, personal experience, dogma, content specificity, or modes of professionalism, have formed a narrowed definition of creativity or their pedagogical approach has become more

narrowly focused. While many of these instructors are capable only at best of following a professional education model, some of them may find they can support student self-development in beginning design courses only as a kind of breather from practice or as a refresher experience.

A fifth difficulty stems from the fact that teaching beginning design courses necessitates working with students to help open them up to their own experiences. In advanced design studios the assumption is that students are already opened to experience and are thus driven by greater self-motivation and/or an agenda they have already set for themselves. Upper level instructors thus do not have to work as directly at this issue but for beginning design instructors it is often the central issue.

### **To Conclude**

This paper has attempted to attribute the misconstrual of beginning design pedagogies as a failure of curriculum to support development of creative skill as an emergent attribute of a designers education and as a failure of instructors to recognize their place within a curriculum structure, especially from the point of view of the developing emergent creative practices of the student instead of (almost in spite of) the point of view of professional education models that progress toward expertise through accumulative knowledge and skills. Research in the psychology of skill characterizes emergent stages of development that readily dovetail with those of creative development but are contradicted by a professional development model. Thus, it is imperative that pedagogical and instructional methodologies that underlie curriculum support skill development in a more systematic manner. Curricular implementation of creative skills can best occur when the instructors that teach it buy into its structure through the four stages of uncertainty, visioning, realization, readiness. Because this structure parallels the four stages of skill development, it suggests it can model a developmental design curriculum that can bring about greater collaborative ownership of the curriculum and thus remove or limit perceived divisions and derived schisms. More importantly, this parallel also offers a means of overcoming divisions by giving clear schema to instructional pedagogies within the curriculum as a foil to the divisiveness of teaching from a personal point of view or in isolation from other courses. Greater understanding of curriculum, and the intentional design of curriculum to foster creativity, instills more developmentally appropriate pedagogies in beginning design studio instruction and throughout the curriculum. Furthermore, since successful curricula sustain student development throughout, no aspect of a curriculum structure should usurp the significance of any other aspect.

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